Milestone-1 Background

Early Remote Control Plane From 1947

3D Robotics Iris Drone Released in 2013

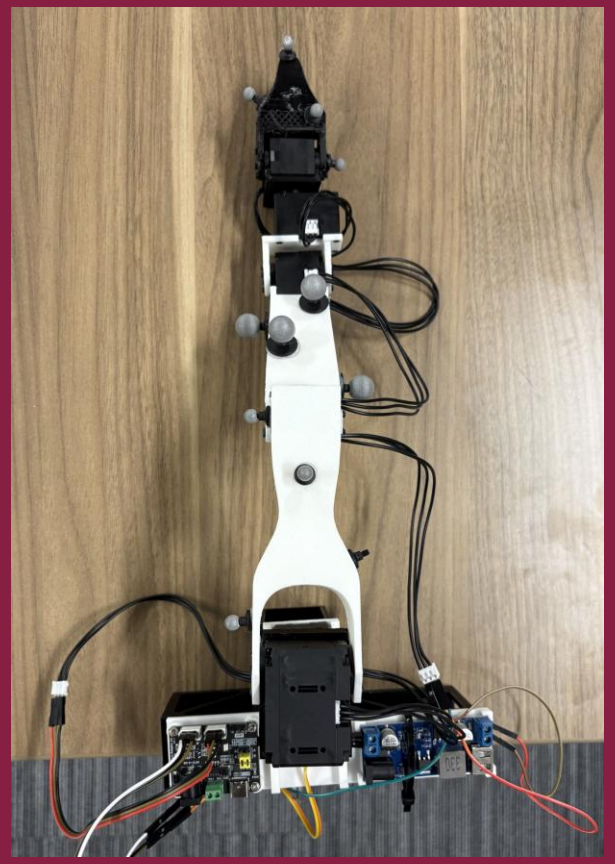
FAA Part-107 First Implemented In 2016

Amazon Delivery Drone

Zipline Platform-2 Drone

Milestone-2 Background

Koch v1.1 Robot Arms



Follower Arm

Leader Arm

Hardware

3d printed predesigned parts

followed video tutorial to assemble arms

Software

Used open-source python scripts for:

- Motor configuration
- Motor calibration
- Arm Teleoperation

Milestone-1 Motivation

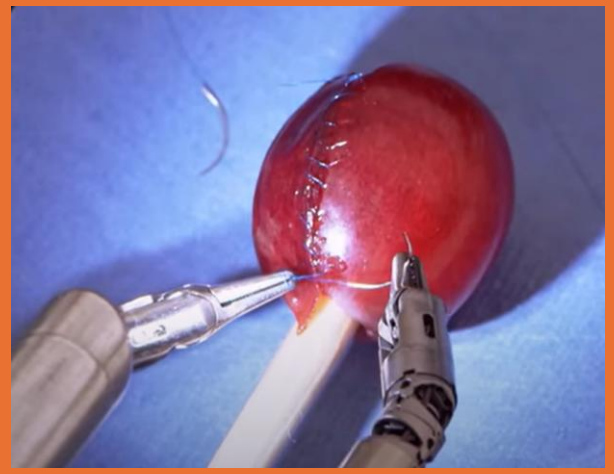
Unexpected Situation

Re ator

Edge VLMs

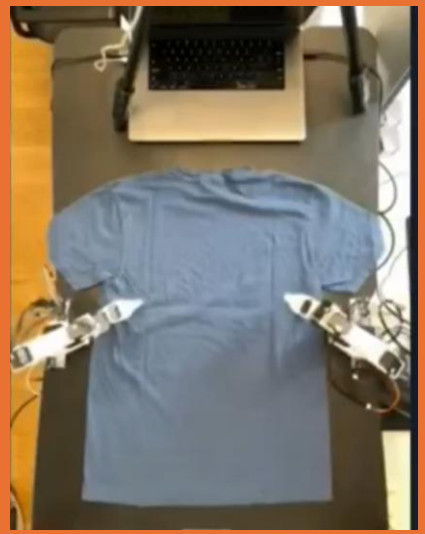
Milestone-2 Motivation

Teleoperation



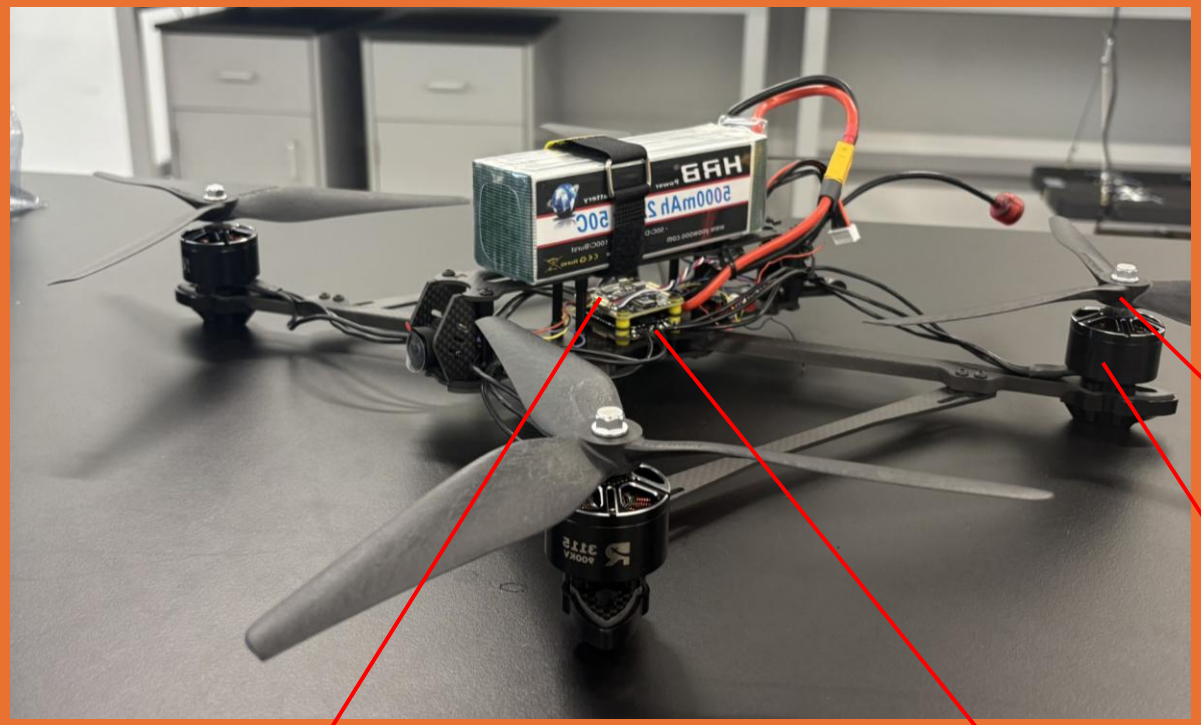
Hardcoding

VLA Model

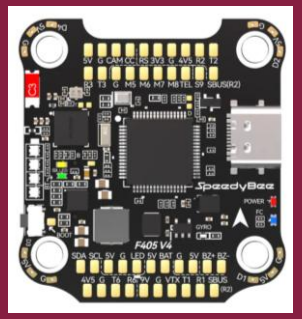


Fold the clothes

Milestone-1 System



Crazyflie 2.1 Brushless



SpeedyBee f405 v4 FC

Microcontroller-
STM32F405 MCU

Firmware-
BTFl 4.5.2

SpeedyBee BLS 55A 4in1 ESC

Microcontroller-
BB21 MCU

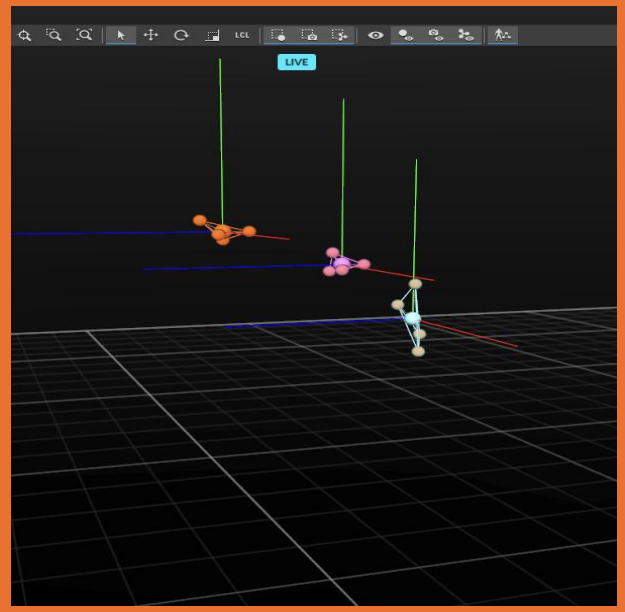
Firmware-
BLHeli_S J-H-40 16.7

10-Inch Drone Propellers

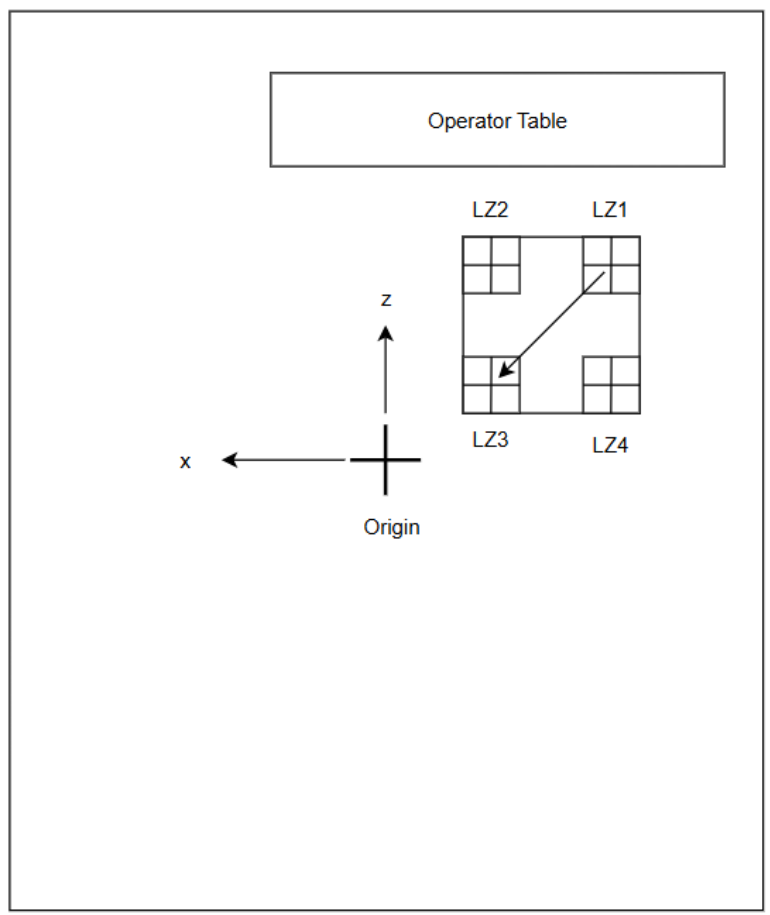
3115 900KV Motors

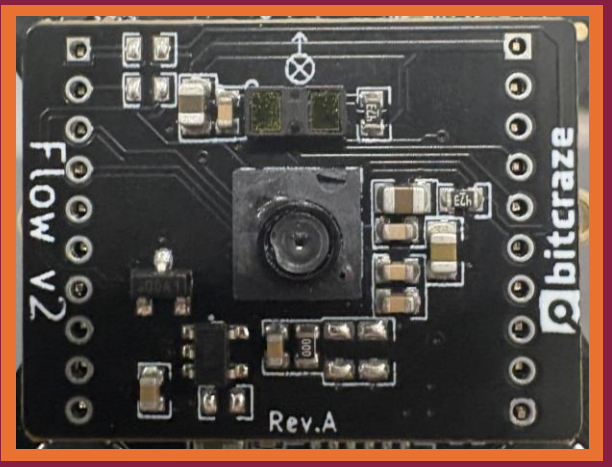
Stator height- 15mm
Stator Diameter- 31mm

Milestone-2 System



Milestone-3 System

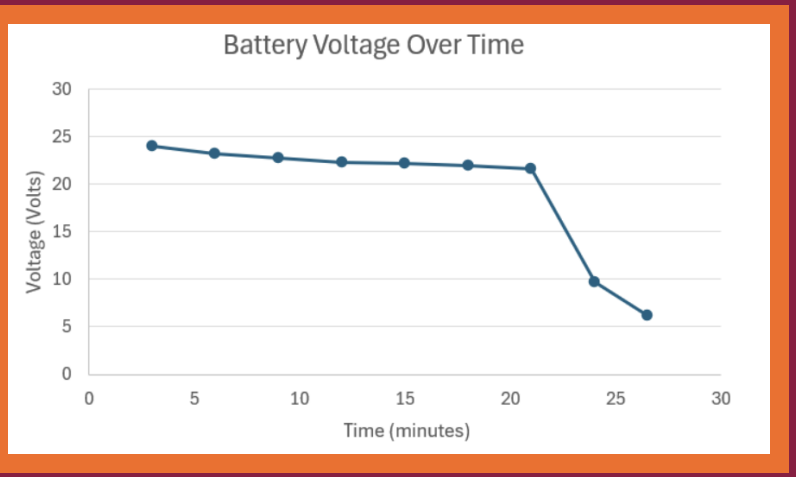




Crazyflie Flow Deck

Optitrack Motion Capture

Milestone-1 Results



48 Meters

167 Meters

290 Meters

Mass

Propellers | 26.38g Each | 105.52g Total

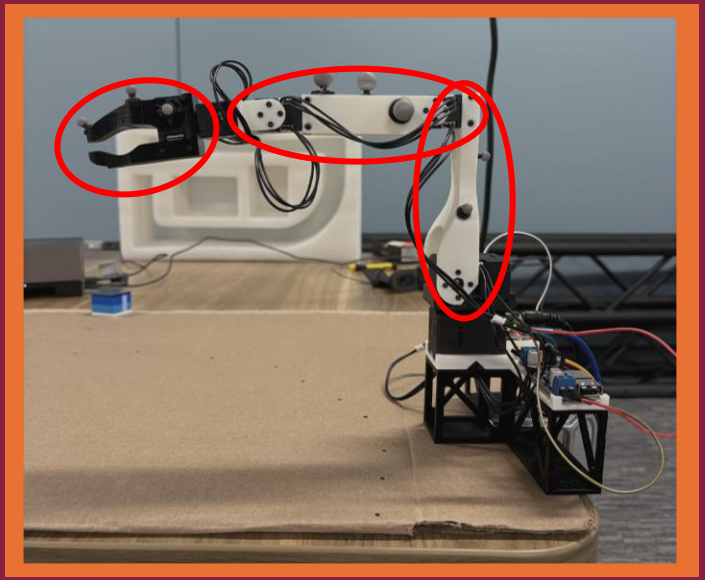
Motors | 103.57g Each | 414.28g Total

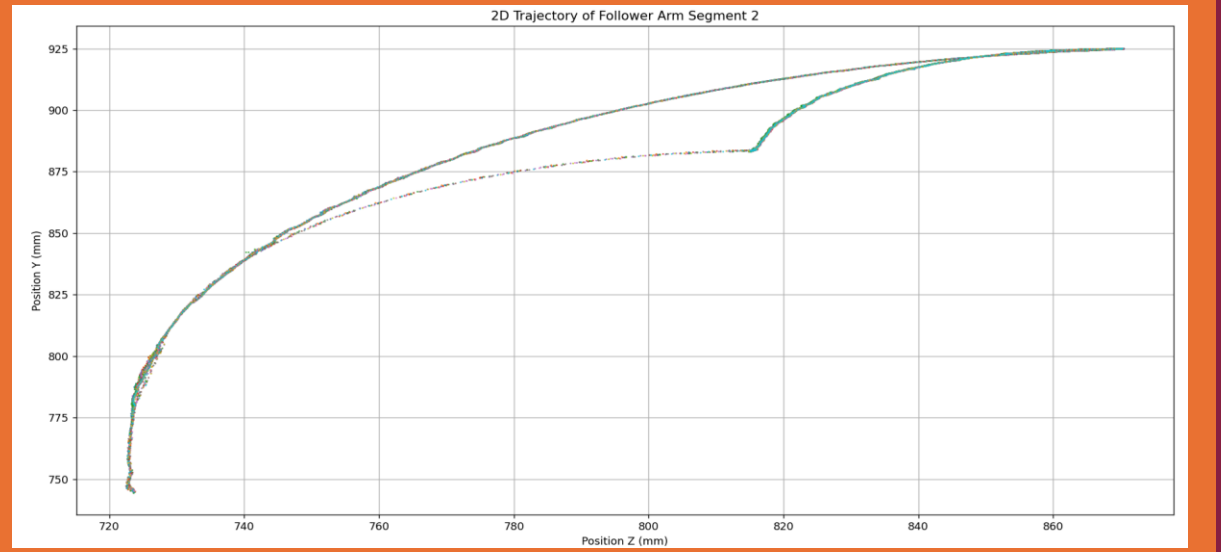
Battery | 719g

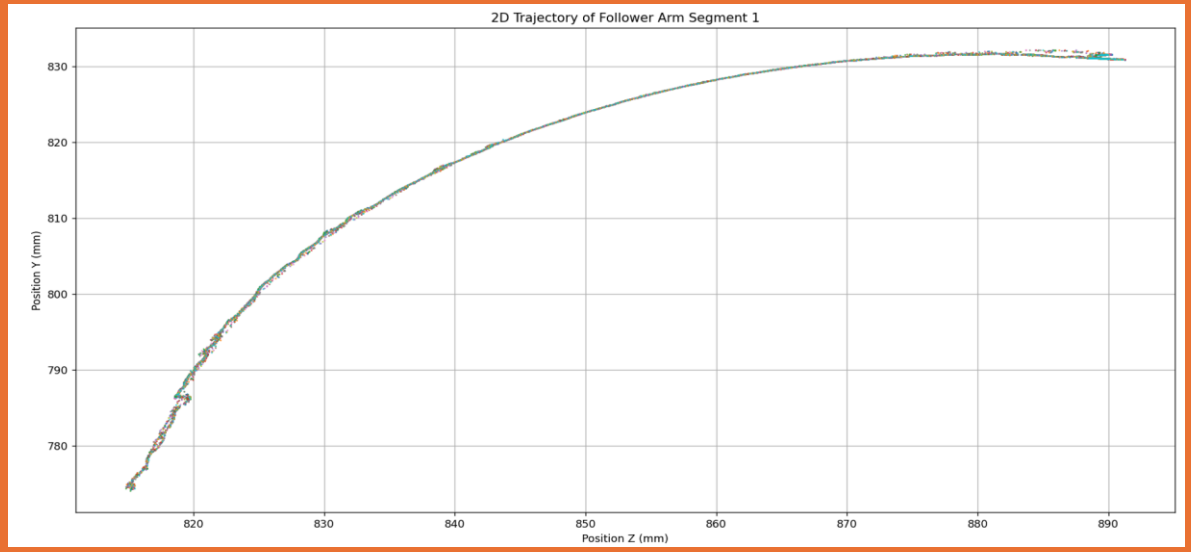
Drone Frame w/elect. | 402g

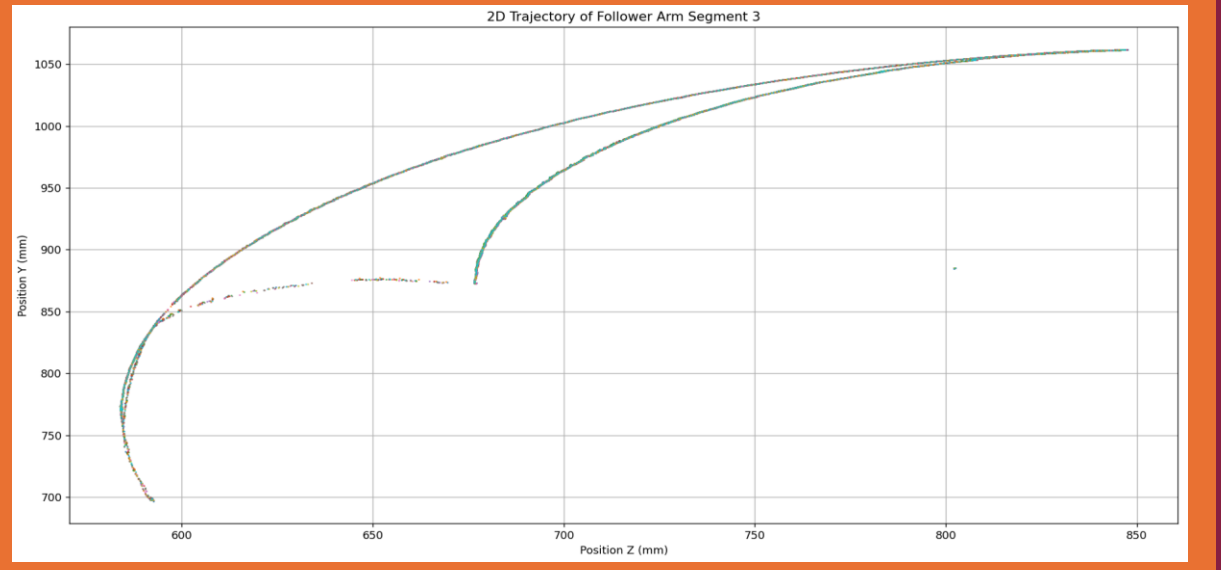
Total | 1.645kg

Milestone-2 Results





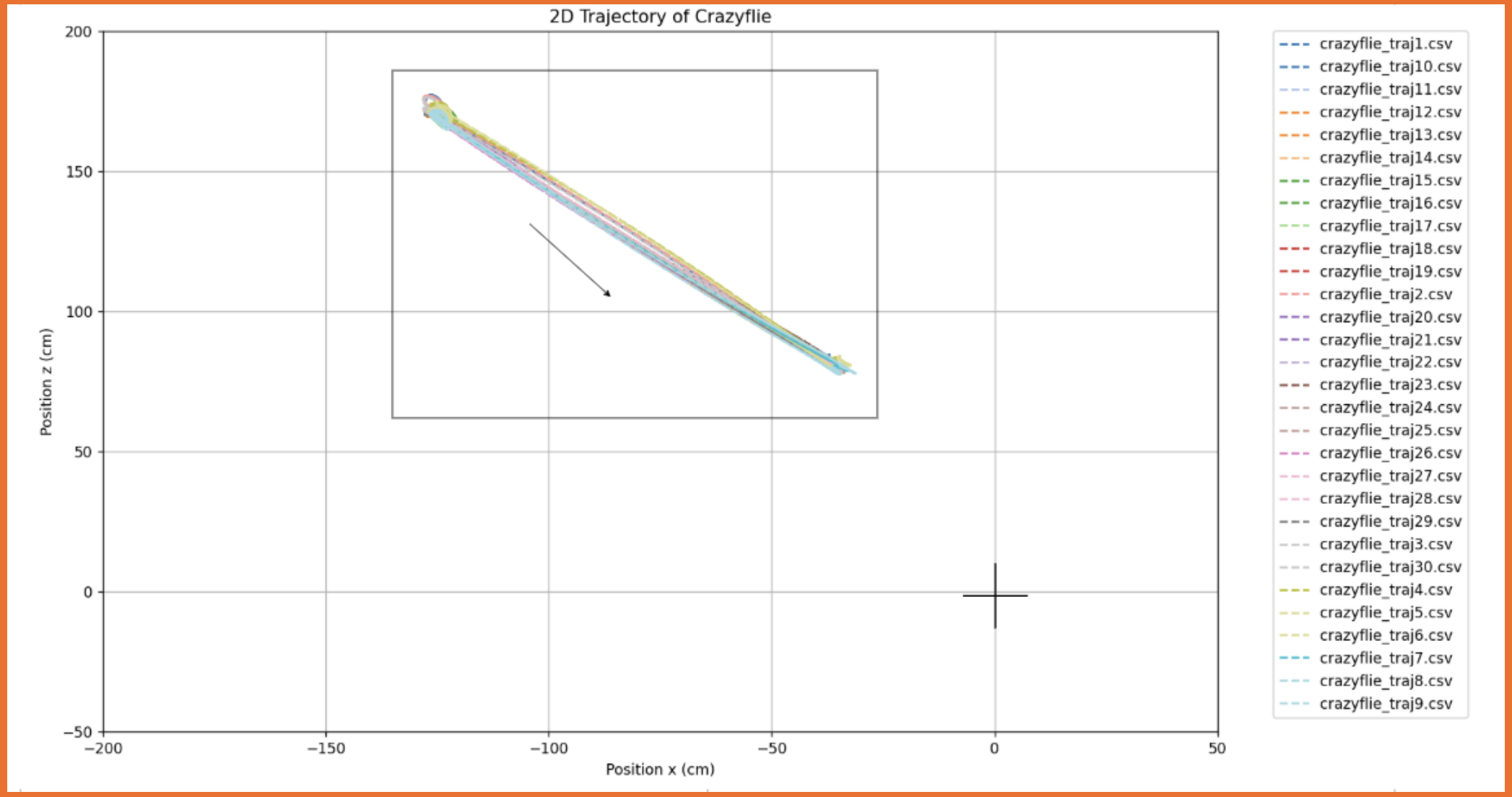




M3-results


2D Trajectory of Crazyflie
Position z (cm)
Position x (cm)
200
150
100
50
0
−50
−200
−150
−100
−50
0
50
crazyflie_flowdeck1.csv
crazyflie_flowdeck10.csv
crazyflie_flowdeck11.csv
crazyflie_flowdeck12.csv
crazyflie_flowdeck13.csv
crazyflie_flowdeck14.csv
crazyflie_flowdeck15.csv
crazyflie_flowdeck16.csv
crazyflie_flowdeck17.csv
crazyflie_flowdeck18.csv
crazyflie_flowdeck19.csv
crazyflie_flowdeck2.csv
crazyflie_flowdeck20.csv
crazyflie_flowdeck21.csv
crazyflie_flowdeck22.csv
crazyflie_flowdeck23.csv
crazyflie_flowdeck24.csv
crazyflie_flowdeck25.csv
crazyflie_flowdeck26.csv
crazyflie_flowdeck27.csv
crazyflie_flowdeck28.csv
crazyflie_flowdeck29.csv
crazyflie_flowdeck3.csv
crazyflie_flowdeck30.csv
crazyflie_flowdeck4.csv
crazyflie_flowdeck5.csv
crazyflie_flowdeck6.csv
crazyflie_flowdeck7.csv
crazyflie_flowdeck8.csv
crazyflie_flowdeck9.csv

Milestone-3 Results



Milestone-3 Results